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THE  
ONTARIO WATER RESOURCES  
COMMISSION  
WATER POLLUTION SURVEY  
VILLAGE OF CAYUGA

1965

VILLAGE OF CAYUGA - 1965  
COUNTY OF HALDIMAND

TD  
380  
.C39  
1965  
MOE

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**TD  
380  
.C39  
1965**

Report on a water pollution  
survey of the village of Cayuga.

80739

R E P O R T

on a

WATER POLLUTION SURVEY

of the

VILLAGE OF CAYUGA

APRIL - 1965

DIVISION OF SANITARY ENGINEERING

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## APPENDIX

ANALYTICAL RESULTS

PLAN SHOWING OUTFALL LOCATIONS

R E P O R T

ONTARIO WATER RESOURCES COMMISSION

I INTRODUCTION

A water pollution survey was made in the Village of Cayuga on June 10 and October 15, 1964 in order to review conditions reported following a similar survey in 1958 and to report on the progress being made in eliminating the sources of pollution.

II GENERAL

The village has a population of approximately 961 and is located at the junction of Highways 54 and 3 on the west bank of the Grand River.

Drainage from the road-side ditches, a limited number of storm sewers as well as from private drains is directed to the Grand River.

The major industrial and commercial establishments within Cayuga are:

Elgin Springs Limited  
Haldimand Farmers Co-op.

III WATER USES

1. Municipal Water System

Water is taken from the Grand River upstream of the village. Treatment consists of clarification and chlorination. The average daily pumpage during 1963 was 53,000 gpd with the maximum pumpage being 149,700 gallons. There are approximately 315 services.

2. Recreational Uses

Pleasure boating and some fishing is practised along the Grand River in the vicinity of Cayuga.

3. Agricultural Uses

The stream is used for livestock watering purposes downstream of the village.

IV WATER POLLUTION

1. Sanitary Waste Disposal

(a) Existing Conditions

There are no sanitary sewers or municipal sewage treatment facilities. Storm sewers are provided for a portion of the village. Most of the premises are served by private septic tank systems, however many of these discharge to the Grand River either by way of a private drain or by a connection to a storm sewer. A survey of the river bank revealed a total of ten drain outlets. Although only five drains were observed to be discharging wastewater, there was evidence of sewage solids at the outlets of four of the other drains.

Soil conditions in the area are of the clay type and therefore lack the absorption qualities required for satisfactory operation of a tile bed system. Many of the establishments in the business district do not have sufficient area for the installation of adequate septic tank systems.

(b) Proposed Sewage Works

A preliminary engineering report was prepared by G. V. Kleinfeldt & Associates Limited, dated August 1963, concerning a system

of sanitary sewers and a waste stabilization pond. Although this report was presented to the village council, no further action has been taken.

2. Refuse Disposal

Refuse collected in Cayuga is transported to an open dump at the south-eastern edge of the village. The dump which is about 10 feet in depth and has an open face of approximately 100 feet is located in a shallow ravine.

A watercourse that is tributary to the Grand River is located near the disposal site. At present there are no pollution problems, however, improper maintenance could lead to water pollution.

In the future, this refuse disposal area will be under the surveillance of the Commission.

3. Industrial Waste Disposal

There are no industrial waste water problems within the village.

4. Discussion of Sample Analyses

The laboratory results of bacteriological examinations and chemical analyses of samples collected during the survey are appended to this report.

Reference should be made to the appended plan of Cayuga for location of the sample points.



(a) Interpretation of Analyses

(i) Bacteriological Examination

The membrane filter (M.F.) technique is used to obtain a direct enumeration of coliform organisms. These organisms are normal inhabitants of the intestines of man and other warm-blooded animals. They are always present in large numbers in sewage.

The Commission's objective is a coliform density of not greater than 2,400 organisms per 100 ml at any point in the receiving stream following initial dilution.

(ii) Biochemical Oxygen Demand (BOD)

BOD is reported in parts per million (ppm) and is an indication of the amount of oxygen required for the stabilization of decomposable organic matter in the water. The completion of the test requires five days under a controlled incubation temperature of 20°C.

The Commission's objective for stream water quality is an upper limit of 4 ppm and waste discharge concentrations should not exceed 15 ppm for 5-Day BOD and suspended solids respectively.

(iii) Solids

The effects of suspended solids in water are reflected in difficulties associated with water purification, depositions in streams and injury to the habitat of fish.

(iv) Summary of Results

The Commission's objective of 15 ppm for 5-Day BOD and suspended solids of waste discharges should be compared to the appended outfall sample results. The BOD results ranged from 55 ppm to as high as 305 ppm which is indicative of raw sewage.

The coliform concentrations of all the samples were excessively high.

V SUMMARY AND CONCLUSIONS

Sample results exhibit the fact that grossly contaminated wastewater was being discharged to the Grand River from five outfalls. Four other outfalls along the river bank were not sampled due to insufficient flow, but sewage solids were observed in the vicinity of the outlets.

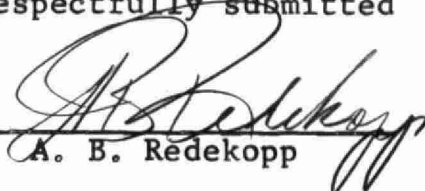
An effective solution would be to proceed with the proposed sewerage system. As noted previously, soil conditions are not conducive to the use of conventional subsurface tile bed systems.

VI RECOMMENDATIONS

It is recommended that the Village of Cayuga proceed with the installation of sanitary sewers and a sewage treatment system.

All of which is respectfully submitted

District Engineer

  
A. B. Redekopp

Prepared by:  
A. C. Cooper

Approved by

  
K. H. Sharpe, Director

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APPENDIX - OUTFALL TABULATION AND ANALYTICAL RESULTS

VILLAGE OF CAYUGA

| <u>SAMPLING</u><br><u>PT. NO.</u> | <u>LOCATION &amp; DESCRIPTION</u>                                  | <u>DATE</u> | <u>5-DAY</u><br><u>BOD</u>                          | <u>TOTAL</u><br><u>SOLIDS</u> | <u>SUSP.</u><br><u>SOLIDS</u> | <u>TURBIDITY IN</u><br><u>SILICA UNITS</u> | <u>M.F. COLIFORM</u><br><u>COUNT/100 ML</u> | <u>EST. DWF*</u><br><u>(GPM)</u> |
|-----------------------------------|--------------------------------------------------------------------|-------------|-----------------------------------------------------|-------------------------------|-------------------------------|--------------------------------------------|---------------------------------------------|----------------------------------|
| G-20.3 (PS-1)                     | PRIVATE DRAIN OUTLET, BRANT ST.                                    | JUNE 10/64  | 55                                                  | 1022                          | 304                           |                                            | 120,000,000                                 | 0.5                              |
| G-20.3 (PS-2)                     | PRIVATE DRAIN OUTLET OFF OUSE ST.                                  |             | INSUFFICIENT FLOW TO SAMPLE - SEWAGE SOLIDS PRESENT |                               |                               |                                            |                                             |                                  |
| G-20.3 (WS-1)                     | 18" STORM SEWER OUTLET SOUTH SIDE<br>OF TALBOT ST.                 | JUNE 10/64  | 66                                                  | 700                           | 204                           |                                            | 1,310,000                                   |                                  |
|                                   |                                                                    |             | HIGH VOLUME (PARTIALLY SUBMERGED OUTLET)            |                               |                               |                                            |                                             |                                  |
| G-20.3 (W -1)                     | STORM SEWER OUTLET NORTH SIDE<br>OF TALBOT ST.                     |             | NO FLOW                                             |                               |                               |                                            |                                             |                                  |
| G-20.3 (WS-2)                     | 18" CONCRETE TILE OFF OUSE ST.<br>(FROM BUSINESS DISTRICT)         | JUNE 10/64  | 145                                                 | 970                           | 130                           |                                            | 147,000,000                                 | 3                                |
| G-20.4 (PS-1)                     | 6" STEEL PRIVATE DRAIN -<br>OUTLET AT KING ST. & OUSE ST.          | JUNE 10/64  | 305                                                 | 2512                          | 318                           |                                            | 350,000,000                                 | 0.5                              |
| G-20.4 (PS-2)                     | BROKEN TILE AT OUTLET 12' NORTH<br>OF ABOVE OUTFALL                |             | INSUFFICIENT FLOW TO SAMPLE - SEWAGE SOLIDS PRESENT |                               |                               |                                            |                                             |                                  |
| G-20.4 (PS-3)                     | 5" TILE OFF OUSE ST. NORTH OF<br>KING ST.                          |             | INSUFFICIENT FLOW TO SAMPLE - SEWAGE SOLIDS PRESENT |                               |                               |                                            |                                             |                                  |
| G-20.4 (PS-4)                     | 3"x6" WOOD BOX TYPE DRAIN OUTLET<br>OFF OUSE ST. NORTH OF KING ST. |             | INSUFFICIENT FLOW TO SAMPLE - SEWAGE SOLIDS PRESENT |                               |                               |                                            |                                             |                                  |
| G-20.4 (DS)                       | OPEN DITCH BESIDE MOHAWK ST. AT<br>OUSE ST.                        | JUNE 10/64  | 55                                                  | 1022                          | 304                           |                                            | 9,000,000                                   | 1                                |

\* DWF - DRY WEATHER FLOW

NOTE: ALL ANALYSES IN PPM



LEGEND

- S-20-3 STREAM SAMPLING POINT SHOWING STREAM & RELEASE
- S-20-3 OUTLET SAMPLING POINT SHOWING STREAM RELEASE AND TYPE (SUBSCRIPT NUMBER USED IF CENTRAL SYMBOL AT ONE POINT)
- TYPE OF OUTLET
- C COMBINED SEWER
  - D DRAINAGE DITCH
  - I INDUSTRIAL EFFLUENT
  - P PRIVATE SEWER
  - R RELIEF SEWER
  - S STORM SEWER
  - T TREATED SEWAGE
  - U UNTREATED OR PARTIALLY TREATED SEWAGE

VILLAGE OF CAYUGA

WATER POLLUTION SURVEY

SCALE

300 150 0 150 300